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ABSTRACT

A knowledge of an individual's preferences is essential to create an effective reward or reinforcer program for individuals who have either a need to reduce maladaptive behaviors or to increase adaptive behaviors. The goal of the Missouri Automated Reinforcer Assessment (MARA) project is to develop an efficient yet thorough automated reinforcer assessment that would systematically assess an individual's preferences and provide an easily understood, written summary of the findings. The development of the MARA will require four phases: Phase 1 involves the collection of items to be used via an open-ended questionnaire; Phase 2 involves the development, programming, and testing of MARA; Phase 3 will be a retest; and Phase 4 involves the application of reinforcers for actual behavior programs. Data collected thus far from 14 adult subjects with brain trauma, chronic schizophrenia, or mental retardation indicate definite specific preferences for items and events. Most subjects preferred a smaller, immediate reinforcer to a larger, delayed one. Includes 12 references. (JDD)

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The Development of the Missouri Automated Reinforcer Assessment (MARA)

Madeleine Vatterott, Ph.D.

A knowledge of an individual's preferences is essential in creating an effective reward or reinforcer program for individuals who have either a need to reduce maladaptive behaviors or to increase adaptive behaviors. Presently, no reinforcer or preference assessment utilizes the potential of a computer in determining individual preferences. An automated assessment may increase the efficiency of a survey by only presenting questions relevant to the subject's age, etc., and it could branch, score, and print-out the results automatically. The development of the automated assessment (MARA) will require 4 phases: Phase 1 involves the collection of items to be used in MARA with an open-ended questionnaire; Phase 2 involves the development, programming, and testing of MARA; Phase 3 will be a retest of the MARA; and Phase 4 involves the application of reinforcers suggested by MARA for actual behavior programs. The subjects will be from populations most likely to have a reinforcer program. The data collected thus far indicate definite specific preferences for items, events, etc. Most subjects preferred a smaller, immediate reinforcer, to a larger, delayed one.*

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THE DEVELOPMENT OF THE MISSOURI AUTOMATED REINFORCER ASSESSMENT (MARA)

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Persons diagnosed as mentally ill or developmentally disabled may perform severe maladaptive behaviors which could have adverse consequences in their quality of living such as placement in a more restrictive living environment, a limitation of vocational opportunities, etc. In treating these individuals, incentives or rewards may be given to them to decrease these maladaptive behaviors, or to increase a positive, incompatible behavior. However, to provide an effective reward or reinforcer, a knowledge of an individual's preferences is essential. Presently, no reinforcer or preference assessment readily available utilizes the potential of a computer to assist in determining an individual's preferences.

An automated reinforcer assessment could provide a more thorough and efficient means to assess preferences by asking only relevant questions based on that person's responses to general questions, and on their age and intelligence, and by providing a ranking of selected reinforcers.

The goal of this project is to develop an efficient, yet thorough automated reinforcer assessment that would systematically assess an individual's preferences and provide an easily understood, written summary of the findings. The use of effective reinforcers in behavior treatment may improve the likelihood of a reduction in maladaptive behaviors for these individuals, which could improve their quality of life.

Method

Subjects

For Phases 1 through 3, between 10-20 individuals will be used as subjects from each of the following populations: two units from a state hospital - a brain trauma unit, and a chronic schizophrenic unit; an inpatient children's psychiatric population; and an institutional and community setting for individuals who are developmentally delayed. Phase 4 will only have subjects from a residential facility for individuals who are mentally retarded. Lists of potential subjects that would be likely to understand the questionnaire were generated by staff who knew the clients well.

Subjects will typically have a mental age of at least 4 or 5 years of age (ranging to above average intelligence), and must be able to hear or read, and to speak or write. Subjects will range in age from 7 to over 60. All subjects will be informed of all of the procedures of the study. Signed consents were obtained prior to inclusion in the study.

Procedure

There will be four major phases in the development of the reinforcer assessment. In Phase 1, a preliminary questionnaire presenting a wide range of reinforcer categories will be given to subjects to obtain an item pool for later use in the automated assessment. In Phase 2, the automated reinforcer assessment will be developed, programmed, and tested with subjects. In Phase 3, individuals from each population will be given the MARA again after either 1, 4, or 8 weeks, to provide information regarding the reliability of the reinforcers chosen. In Phase 4, the reinforcers suggested by the assessment will be used in reinforcer programs addressing maladaptive behaviors for individuals who are classified as mentally retarded. Phase 1 and 2 are being conducted at this time.

Phase 1 - The Preliminary Questionnaire

The questionnaire contains items from the following general reinforcer categories: food, material possessions, games, pets, reading materials, topic interests, sports, desired responsibilities, activities, helping others, planned rewards, and desired social interactions. One item in the questionnaire will address the subject's ability to wait for a delayed reinforcer (i.e., their ability to wait for something that he or she likes). The final item will allow the subject to add any additional preferences that had not been mentioned.

Pretest. A gross, informal assessment of a subject's ability to understand spoken questions and to respond verbally was given prior to implementing the questionnaire. This involved casually asking the subject how they were, whether we were interrupting them, what they thought of the weather, etc. This interaction also served to familiarize the subject and the interviewer.

Questionnaire. The questions will be read to the each individual, and the research assistant (trainer, teacher, aide, etc.) will write the subject's responses on the questionnaire. This will continue for each of the 30 questions on the survey. The answers obtained from the questionnaire will be collated and scored for frequency of occurrence within and across the different population samples. The more frequent items named will be chosen for the automated assessment. A list of the most frequently occurring items from the questionnaires collected thus far are presented in Table 1.

Phase 2 - The Missouri Automated Reinforcer Assessment (MARA)

The MARA will be programmed with Knowledge-Pro (produced by Knowledge Garden, Inc.), a software-development tool that is often used to develop expert systems. The assessment will be written for IBM or IBM compatible micro-computers. For some subjects, a touch screen will be used to obtain responses, while other subjects will use the arrow keys or the mouse. A printer will be used to print the results of the assessment.

MARA Administration and Presentation Format

General catetories. After obtaining the demographic information from the subject, the reinforcer assessment will be given. General categories of reinforcers (such as desserts or snacks) will be presented on the screen and subjects will be asked to indicate how much they like that category.

Specific items. A list of specific items from a category (e.g., a list of specific games from the category of games) will then be presented after each category in which the subject indicated that they liked. The specific items presented from a category will be the most frequently cited as "favorite" from the open-ended questionnaire. Subjects will be asked to select 3 of the items that they like best from that list. If a particular specific item requires even more detailed information (for example, *flavor* of ice cream, for the specific item of ice cream in the general category of "desserts"), then a pop-up menu listing the more detailed choices will be presented (for example, chocolate, vanilla, strawberry, etc.). Several lists of items which were found to be very popular from the open-ended survey will also be presented to the subjects, along with a question regarding if there was anything that he or she liked most that was not asked about.

Level of deprivation of most preferred items. Each most preferred item will be presented again and the subject will be asked how much more he or she would like to receive (or engage in) that item than what is currently received. In this way, information will be obtained not only regarding the degree to which a person likes an item, but also the degree to which he or she feels deprived of the desired item. It is expected that a preferred item that a person is deprived of (i.e., something the person would want more of) will be more reinforcing than a preferred item that is not (see the response deprivation hypothesis, Timberlake & Allison, 1974). Following all of the general and specific item presentations, the subjects will be asked if they would like to review or edit their responses.

Overall lists. The items that were selected from the lists as most preferred, and that were indicated as something that the individual would like to receive more often, will be presented a

third time. The subject will be asked to choose from this list his or her overall most preferred items.

Response format. The response format for the general categories will be a scale with three anchors to respond to the question "How much to you like...?", "Very much", "A little", and "Not at all". The subject will be able to make a response with the arrow keys or the mouse, or by pointing if a touch screen is used. The response format for the level of deprivation questions will be a scale with three anchors: "want a lot more", "want a little more", and "have enough already".

Print-out. A print-out will be computer-generated which presents all items that the subject had chosen as most preferred, as well as those items that he or she had indicated as wanting to receive more often. The print-out will also indicate the overall most preferred reinforcers for that individual.

Post-assessment. Following the assessment, subjects and staff will be given several questions regarding their opinion of the assessment. The printout will be read to the subjects and they will rate how well the summary represents what they like. The subjects will also be asked to choose between a list of reinforcers generated by staff, and one generated by the MARA. Attempts will be made to insure that the lists are similar in cost and time for staff involvement. Following these questions, the individual will be debriefed.

The printouts from an individual subject and 3 other subjects of the same sex, with similar chronological and mental ages, will be given to the parent or staff member, and they will be asked to choose the printout that they think best summarizes what that subject likes (without conferring with them). Also, the staff or parent of some of the subjects will be asked to answer the reinforcer assessment from the viewpoint of what they think that subject would like.

Phase 3 - Retest of the MARA

Individuals from each population will be given the MARA again after either 1, 4, or 8 weeks, to provide information regarding the reliability of the reinforcers chosen. Subjects will be randomly assigned to be re-assessed at the different follow-up periods.

Phase 4 - Treatment Application of the MARA

An omission training (or DRO) procedure using reinforcers suggested by the MARA will be implemented on a unit in a state facility to assess the ability of these reinforcers to change a maladaptive behavior. After a baseline procedure, subjects will be randomly divided into two groups. One group will receive an omission training procedure addressing a maladaptive behavior using reinforcers suggested by the MARA, and the other group will continue any programming currently in effect. Both groups will

have their targeted behaviors monitored. Treatment will continue for at least one month.

The reinforcers used in the omission training will be selected from the list of reinforcers considered most preferred on the MARA, while also considering their feasibility (i.e., expense, staff time required, ability to deliver repeatedly, etc.).

Results

A frequency count of preferred items obtained thus far from Phase 1 is presented in Table 1. There were 14 subjects, 12 males and 2 females, with ages ranging from 22-52 years. There were 7 subjects from a brain trauma unit at a state facility, 3 from a chronic schizophrenic unit, and 4 from an independent living center for mentally retarded individuals who are high functioning. One subject from the chronic schizophrenic unit began the survey but did not complete it because of apparent frustration and hostility towards the examiner; another subject from the brain trauma unit requested to quit before completing the survey.

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Table 1
Most Preferred Items from Open-ended Questionnaire (Phase 1)*

Question	#1	#2	#3
1. Eat for dinner	steak(4)**	fried chicken(3)	lasagna/burgers(2)
2. Snacks	candy bars/cookies (4)***	fruit/ice cream/(3) cake/sandwiches	pie/Fritos/ popped corn(2)
3. Drinks	soda(15)	fruit juice/tea/ alcohol(4)	coffee/milk(3)
4. Indoor games	cards(11)	checkers(3)	other****
5. Pets/animals	dogs or puppies(11)	cats or kittens(9)	monkeys(2)
6. To read	Westerns(3)	magazines/Bible(2)	other
7. Topics to learn	Math(4)	English/Science(2)	other
8. Type of music	rock and roll(7)	country(5)	jazz(4)
9. Sport to play	baseball(7)	basketball(4)	football(3)
10. Sport to watch	baseball(6)	soccer(3)	football(2)
11. Do outside	go for a walk(6)	yardwork(5)	go swimming(3)
12. Want to buy	car, motorcycle(7)	eat, drink/clothes (4)	tapes, records(3)
13. Chores	housework(5)	yardwork/run home(4)	other
14. Reward self-day	a drink(11)	entertainment(5)	snack/activity(4)
15. Do in free-time	listen to music/TV (4)	nothing/sleep/cards (2)	other
16. Want to do in free-time	vacation/with woman (5)	get a job/concert (2)	other
17. Activity to try	water-skiing, surfing(5)	snow-skiing/6-Flags (2)	other
18. Enough attention	Yes (9)	No (3)	I don't know (1)
19. Type attention	good/individual/ women(2)	other	
20. One candy now or two later	one now (8)	two later (5)	blank (1)
21. Help someone do	I don't know(4)	housework/outdoor(2)	other
22. Extra good work	raise(6)	thank-you, praise(4)	buy tapes(2)
23. Others do, say	give me money(2)	other	
24. With a friend	talk or visit(5)	out to movies/eat(4)	recreation(3)
25. With opposite sex	take out - movie, eat, date(9)	affection or sex(7)	talk/recreation(4)
26. By yourself	listen to music(6)	eat/TV-movies/read (3)	sleep/find girlfriend(2)
27. In life	being with someone (3)	helping someone(2)	other
28. Like most	listening to music (5)	women/family(3)	I don't know(2)
29. Three wishes	money(8)	car/own house(4)	girlfriend-wife(3)
30. Anything else	I don't know(6)	watch TV(2)	other

* n = 14
** Number in parentheses indicates total frequency of occurrence
*** The symbol "/" is used when items occurred with the same frequency
**** "other" indicates that the only responses remaining had a frequency of 1